REMARKS

By this amendment, Applicants have amended the claims to more clearly define their invention. In particular, claim 5 has been amended to recite that the base member has flat surface and a curved surface on a side of the base member opposite the flat surface, the pattern member being bonded to the curved surface of said base member, and to recite that flat resin substrate or the flat resin film on the substrate is inflected and pressed using the press machine and the nanoprint mold. This amendment is supported by, e.g., Figures 7a-7c. Applicants have canceled claims 7 and 9-11 without prejudice or disclaimer.

In view of the cancellation of claims 7 and 9-11, the rejection of these claims under 35 U.S.C. §112, first paragraph, is moot.

Claims 5-8, 25 and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP-02-305612 in view of U.S. Patent Application Publication No. 2004/0009673 A1 to Sreenivasan et al. Applicants traverse this rejection and request reconsideration thereof, at least insofar as it applies to the claims as presently amended.

The present invention relates to a nanoprint mold for deforming a flat resin substrate or a flat resin film on a substrate to form a fine structure on a substrate with use of a press machine. See, e.g., Figures 9a-9c of the subject application. According to the present invention and as shown by way of example only in Figures 5a, 5b, 6a, 6, 7a-7c, 8, 9a-9c and 10, the mold includes a laminated structure including a base member having flat surface and a curved surface on a side of the base member opposite the flat surface, and a pattern member having a concave-convex pattern, said pattern member being bonded to the curved surface of said base member. The pattern member is bonded to the base member, and perimeters of the pattern member and the

base member are coextensive. The mold is provided with a curved surface on the side thereof on which the concave-convex pattern is formed. The flat resin substrate or the flat resin film on the substrate is inflected and pressed using the press machine and the nanoprint mold. The mold is also provided with a deep groove (deeper than the concave portions of the concave-convex pattern) at a center portion of the mold between extending to an open to the periphery portions. By virtue of the curved surface and the deep groove, the mold is easily released from the flat resin substrate or flat resin film after forming the fine structure. With the use of the deep groove, air is introduced to the deep groove at a center of the substrate to provide a release-start point resulting in the ease of releasing the substrate from the mold after transfer printing.

JP-02-305612 discloses a flat mold is inflected for the purpose of preventing large foams. After contacting an arbitrary point of the mold with a substrate with spread film, the degree of the inflection is gradually reduced to a flat condition of the mold to contact the entire surface of the mold with the substrate. The mold structure in JP-02-305612 is very different form that of the present invention. In the present invention, a mold is provided by preparing a base member having a curved surface and flat back surface and attaching a pattern layer to the curved surface of the base member to form a curved pattern surface. The curved surface is impressed onto a substrate so that the substrate is inflected by the effect of the curved surface of the mold and the pattern is transferred to the substrate. After transferring the pattern, by releasing the curvature condition of the substrate, it becomes easier to separate the mold from the substrate. See paragraph [0062] of the published application.

The Sreenivasan et al. publication discloses a lithography process for creating patterns in an activating light curable liquid using electric fields followed by curing of the

activating light curable liquid. While the Sreenivasan et al. publication discloses a lithography process, the imprints are preformed on flat articles. The Sreenivasan et al. publication does not disclose a mold provided with a curved surface on the side thereof on which the concave-convex pattern is formed.

On the other hand, according to the present invention, the mold comprises a laminated structure, the laminated structure including a laminated structure including a base member having flat surface and a curved surface on a side of the base member opposite the flat surface, and a pattern member having a concave-convex pattern, said pattern member being bonded to the curved surface of said base member, the pattern member being bonded on the base member, the perimeters of the pattern member and the base member being coextensive. Such is not disclosed by JP-02-305612 and/or Sreenivasan et al. Therefore, the presently claimed invention is patentable over the proposed combination of documents.

Claims 3, 4, 9 and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over JP-02-305612 in view of Sreenivasan et al. and further in view of U.S. Patent No. 2,201,302 to Rowe. Applicants traverse this rejection and request reconsideration thereof, at least insofar as it applies to the claims as presently amended.

The Rowe patent discloses a rubber stamp 11 having a printing surface 12, a thicker central body 13, a resilient pad 24, and a backing element 19. The stamp holder 15 has a body 16 and a threaded extension 17 carrying a nut 18. The rubber stamp 11, the resilient pad 24 and the backing element 19 are held by the flange 27, which clamps over the flange 14 of stamp 11. The outer surface of the backing member 19 is shown as spherically convex, because it is particularly adapted for use with a holder 15 for printing on spherically concave surfaces. The spherical convex

surface of backing member 19 of Rowe is for printing on spherically concave surface of glass lamp bulb, but is not for facilitating the release of a rubber stamp from the glass bulb.

For the reasons set forth in the remarks accompanying the Amendment and Submission Under 37 CFR §1.114 filed August 5, 2009, one of ordinary skill in the art would not have recognized the techniques or stamp of Rowe as applicable to the process or template of Sreenivasan et al. Accordingly, it is submitted there would not have been any apparent for one ordinary skill in the art to have combined the disparate teachings of Sreenivasan et al. and Rowe (and therefore JP-02-305612, Sreenivasan et al. and Rowe).

Moreover, even assuming, arguendo, one of ordinary skill in the art would have combined the teachings of Sreenivasan et al. and Rowe (and therefore JP-02-305612, Sreenivasan et al. and Rowe), even the combined teachings would not have rendered obvious the presently claimed invention.

In Rowe, the object to be printed, i.e., the spherically concave surface of a glass lamp bulb, is not made of deformable material such as resin film or resin substrate. Thus, in Rowe, the spherical convex surface of the backing member 19 is for printing on a spherically concave surface of a glass lamp bulb. That is, the curvature of the surface of the backing member 19 is designed to match the curvature of the surface of the bulb. The rubber stamp 11 is pressed to the surface of the glass bulb but is not pressed into the surface, i.e., it is not for deforming a flat resin substrate or a flat resin film on a substrate, as is the nanoprint mold of the present invention. Thus, the Rowe patent fails to provide any teachings with respect to release of a nanoprint mold from a flat resin substrate or a flat resin film on a substrate. Thus, there are no peeling forces acting on the stamp of Rowe.

On the other hand, according to the present invention, the mold comprises a laminated structure, the laminated structure including a base member having a curved surface and a pattern member having a concave-convex pattern, the pattern member being bonded on the base member, the perimeters of the pattern member and the base member being coextensive. Since the pattern member and the base member are coextensive, the concave-convex pattern can overspread the curved surface of the mold.

According to the present invention, the mold is provided with a curved surface on the side thereof on which the concave-convex pattern is formed, and the side of said mold on which the concave-convex pattern is provided with a deep groove, deeper than concave portions of the concave-convex pattern, at a center portion of the mold between periphery portions. Since the mold is provided with a curved surface and a deep groove, it allows air to be introduced into the deep groove and provide a release start point for releasing the mold from the flat resin substrate or flat resin film during use of the mold.

Even if the concave-convex pattern can overspread the curved surface of the mold, the pattern member can be prevented from being peeled from the base member in a releasing step due to the deep groove. Such is not taught by Rowe.

In addition, in the stamp device of Rowe, the object to be printed, which is glass lamp bulb, has a spherical convex surface and is not made of deformable material such as flat resin film or flat resin substrate. In Rowe, a relatively large force is not necessary to release the rubber stamp proper 11 from the glass lamp bulb, and therefore, no peeling force acts on the rubber stamp proper 11. Rowe fails to teach the pattern member may be peeled from the base member in a releasing step.

Rowe also fails to teach the pattern member being bonded on the base member, and the perimeters of the pattern member and the base member being coextensive. Rowe fails to teach that the concave-convex pattern can be overspread the curved surface of the mold.

On page 5 of the office action, it is contended that the Rowe stamp is inherently suitable for pressing against a flat resin film. The Rowe stamp is a general stamp for use of printing or etching symbols or numerals with ink or etching liquid on glass and is not a stamp for use of nano-printing. The technical field to which the Rowe stamp belongs is different from that to which the nano-printing of the present invention does. Accordingly, there is no evidence that the Rowe stamp is not inherently suitable for nano-printing against a flat resin film.

Moreover, the teachings of Rowe suggest using a curved backing member for printing on a curved surface, i.e., matching the curvature of the stamp to the surface being stamped. Since the Sreenivasan et al. publication creates patterns in a flat surface, the teachings of Rowe would teach away from the present invention, i.e. would teach matching the template to the surface. Since the surface to be imprinted in Sreenivasan et al. is flat, it is submitted the teachings of Rowe would suggest to one of ordinary skill in the art to use a flat template. Thus, the Rowe patent teaches away from the presently claimed invention in which a curved surface is used to form a fine structure on a flat resin substrate or a flat resin film.

For the foregoing reasons, the presently claimed invention is patentable over the proposed combination of JP-02-305612, Sreenivasan et al. and Rowe.

Claims 6 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over JP-02-305612 in view of Sreenivasan et al. and further in view of U.S. Patent

Application Publication No. 2002/0132482 A1 to Chou. Applicants traverse this rejection and request reconsideration thereof.

The Examiner has cited the Chou publication as allegedly teaching several means to soften or cure a film such as UV and heating. Reference number 3 in Fig. 3 of Chou is a sealing member of a mold and a thin film. The purpose of providing the sealing member is to permit external fluid pressure to press a mold into the film. See paragraph [0024]. Thus, Chou discloses forming a groove (recess) on the portion of the mold and the substrate to which the sealing member is applied to achieve press transfer of a pattern with smaller pressure, as shown in Fig. 6D. However, Chou does not consider using the sealing member as a reactive force in separating the mold from the substrate. Accordingly, clearly nothing in Chou remedies any of the basic deficiencies noted above with respect to JP-02-305612 and Sreenivasan et al.

Accordingly, claims 6 and 11 are patentable at least for the reasons noted above.

Claims 27 and 28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over JP-02-305612 and Sreenivasan et al. and further in view of JP-9-511710. Applicants traverse this rejection and request reconsideration thereof.

JP '710 has been cited by the Examiner as allegedly teaching bonding a base member and a pattern with PDMS, which functions as an adhesive and helps to facilitate contact with a coarse or curved surface. However, clearly nothing in JP '710 would have remedy the basic deficiencies noted above with respect to JP-02-305612 and Sreenivasan et al. Accordingly, claims 27 and 28 are patentable over the proposed combination of documents, at least for the reasons noted above.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

Please charge any shortage in the fees due in connection with the filing of this paper, including excess claim fees, to Deposit Account No. 01-2135 (1021.43672X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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